

# Renewables for a Green and Resilient Recovery



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## **ABOUT THIS DOCUMENT**

*Renewables for a Green and Resilient Recovery* is meant as a collection of case studies and best practices for local and regional governments globally in managing their recoveries in the aftermath of COVID-19, while simultaneously addressing the climate emergency.

**AUTHORS:** Zoe Durruty (ICLEI World Secretariat)

**CONTRIBUTORS:** Marrien Kalapula, Kanak Gokarn, Rohit Sen (ICLEI World Secretariat)

**DESIGN:** Kanak Gokarn (ICLEI World Secretariat)

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## **ABOUT THE 100% RENEWABLES CITIES AND REGIONS ROADMAP PROJECT**

The 100% Renewables Cities and Regions Roadmap project facilitates the energy transition by raising local awareness on renewable energy sources, showcasing how local and national governments can create coordinated enabling frameworks and policies, exploring access to public and private sector finance, and building local renewable energy projects to address electricity, heating and cooling.

The 100% Renewables Cities and Regions Roadmap is implemented by ICLEI and funded by the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) through the International Climate Initiative (IKI).

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ICLEI – Local Governments for Sustainability is a global network working with more than 2,500 local and regional governments committed to sustainable urban development. Active in 125+ countries, ICLEI influences sustainability policy and drives local action for low emission, nature-based, equitable, resilient and circular development. ICLEI's Members and team of experts work together through peer exchange, partnerships and capacity building to create systemic change for urban sustainability.

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## **CONTACT**

ICLEI – Local Governments for Sustainability e.V.  
Kaiser-Friedrich-Str. 7  
53113 Bonn | Germany  
Tel. +49-228 / 97 62 99-00  
[sustainable.energy@iclei.org](mailto:sustainable.energy@iclei.org)  
[www.iclei.org](http://www.iclei.org)

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# INTRODUCTION

The COVID-19 pandemic has led to unprecedented health, economic and social challenges caused by lockdowns, increasing unemployment levels, and rising social inequality and poverty. Urban areas have been hit the hardest, accounting for 90 percent of COVID-19 cases (United Nations, 2020). Cities and sub-national authorities have been on the frontlines to fight the pandemic, ensuring the safety of their residents and rearranging urban services in order to continue the delivery of services, while coping with the economic effects of the health crisis. In order to spur an economic recovery following the disruption caused by the pandemic, governments worldwide have put forward several stimulus measures and initiatives.

The health and economic crises due to the pandemic have unfolded under the overarching climate emergency, which demands equally urgent action. Given this context, measures that are meant to boost economic outcomes can also be used to address climate concerns in tandem. The goal for many countries has therefore been to achieve a 'green and resilient recovery'—combining short- and long-term measures for boosting

change and building resilience in the face of future shocks, climate-related or otherwise (Bapna & Gorissen, 2020).

Renewable energy (RE) has the potential to contribute to all of these objectives by creating local jobs, improving health outcomes, promoting the use of local resources, and being low-to-zero emissions. Thus, this paper aims to lay out the current energy scenario in the wake of the pandemic, and explore the ways in which renewable energy can contribute to a green recovery while improving overall resilience for local populations in the face of climate change going forward.

# COVID-19 & THE ENERGY TRANSITION

The initial phases of the COVID-19 pandemic caused extreme disruptions to the global economy and the energy sector, with potentially long-term consequences. The drop in economic activity led to a drastic fall in energy demand, with the fall in industrial output and transportation usage due to lockdowns and other restrictions impacting fossil fuel usage in particular. Many projects in the pipeline, including in the renewable energy sector, faced disruptions related to stalled construction activity and difficulties in attracting investment.

In the first quarter of 2020, pandemic-related lockdowns in many cities led to a contraction of primary energy demand by 3.8 percent compared to the first quarter of 2019 (International Energy Agency, 2020). This drop was considerably greater than the one during the 2008-09 financial crisis. In 2020 overall, oil demand was 9 percent lower than for 2019. Coal demand fell by 4 percent, and this fall was even more pronounced in the power sector. Natural gas demand fell by only 2 percent in 2020 due to a number of factors, including low prices and fuel-switching. Electricity demand fell overall by 1 percent in 2020; however, at the height of restrictions, demand in some

The drop in energy demand rippled throughout the energy sector value chain. The loss of employment in the energy sector was substantial, as was the impact on supply chains, including for renewable energy. Globally, 21 percent of jobs in the oil industry were expected to be laid off, representing over one million workers (Rystad Energy, 2020). The other major impact was due to a reduction in global energy investment. As of October 2020, investment estimates continued to point to a record slump in spending following the fall in demand, which impacted projects that were not yet closed. Fuel supply chains were the hardest hit with oil and gas spending declining by 35 percent. Electricity generation investment also declined by 7 percent (International Energy Agency, 2020). The recovery of the oil market was initially expected to be rather slow, with high degrees of uncertainty and continued vulnerability to the effects of the pandemic (Fattouh & Economou, 2020).

In terms of the climate emergency, in 2020, declines in energy demand and particularly fossil fuel demand resulted in a major drop in global CO<sub>2</sub>

emissions of 5.8 percent compared to 2019, surpassing any previous declines (International Energy Agency, 2020). In 2021 however, as many economies begin to recover and restart production, emissions are projected to approach the 2018-19 peak but not exceed it due to the continued depressed demand for oil. However, as electricity demand picks up, especially in countries in Asia, coal demand was projected to increase to above 2019 levels, underpinning a rise in CO2 emissions from coal to 0.4 percent above 2019 levels (International Energy Agency, 2021).

It is interesting to note that renewable energy did not face similar drops in demand, and instead saw increases in usage. In Q1 2020, due to the nature of renewable energy dispatch and new capacity additions pre-pandemic, RE generation increased by around 3 percent (International Energy Agency, 2020). Because of reduced electricity demand, many fossil fuel-based power plants were not able to run. In terms of the broader climate emergency, this also helped highlight the importance of energy efficiency and conservation measures and that they must go hand-in-hand with the increased deployment of renewable energy sources in order to facilitate the energy transition.

Still, renewable energy projects were not immune to disruptions caused by pandemic-related restrictions. However, renewable capacity additions are expected to rebound in 2021. While projects with long lead-times, such as hydropower, were less affected by the pandemic, lower fossil fuel prices have posed a challenge to renewable energy sources, which suggests that even now pure market forces may not always be favorable to renewables expansion, necessitating government support and favorable policies in some cases (International Energy Agency, 2020).

While certain measures were needed to ameliorate the acute effects of the pandemic, well-considered policies with long-term horizons can enable governments to enact measures that tackle the climate emergency simultaneously as well as ensure a robust economic recovery. There is considerable synergy among the two—prioritizing action on clean and renewable energy, energy efficiency and conservation, and greater energy systems resilience, can allow governments to spur economic activity through accelerating the energy transition, and aid their mitigation, adaptation and resilience efforts in face of the climate emergency. Many governments have done so.

# RENEWABLES AS A GREEN AND RESILIENT RECOVERY MEASURE

The recovery after COVID-19 has allowed for an opportunity to accelerate climate action and transform development trajectories towards achieving climate change mitigation targets by mid-century, and improve resilience against future shocks. Renewable energy, electrification and energy efficiency can be key pillars for both priorities (IRENA, 2020).

As such, a broad global consensus on a green and resilient recovery has emerged. Researchers, international development organizations, financial institutions, and governments have consented to direct COVID-19 recovery packages towards also addressing the climate and biodiversity crises through a focus on renewable energies and low-carbon development (Umweltbundesamt, 2020). The core of the idea of a green and resilient recovery is a long-term strategy that enables governments to better withstand such crises in the future, avoiding or mitigating to a great extent the disruptions in the energy system itself, and easing the path to economic recovery. Many governments have already mainstreamed 'green' recovery measures in their policy packages

designed to address the short- and medium-term socio-economic impacts of the pandemic.

The promotion of renewables can also be a powerful engine for economic recovery. It can help create new and secure jobs (Frankfurt School-UNEP Centre/BNEF, 2020). The renewables sector already accounts for 20 percent of the jobs in the energy sector (IRENA, 2021).

According to some scenarios, such as IRENA's 1.5°C scenario, jobs in the renewables sector could number at over 40 million by 2050 across the value chain and across varying qualifications. By contrast, the jobs in the fossil fuel sector are projected to decrease over the long term as a consequence of the transition.

These trends show that the renewables sector is likely to face less volatility than the fossil fuel sector over the long run, providing some level of economic resilience and certainty in the face of the climate crisis. Renewables have shown their resilience during the crisis by having proven better than conventional generation sources in terms of capacity additions and investment (Frankfurt School-UNEP Centre/BNEF, 2020).

Even over the long-term, with the clear trend of moving away from fossil fuels, investing in renewable energies can help future-proof energy systems as policies are likely to increasingly favor low- to zero-carbon sources. Several major oil and gas companies are also pivoting their operations towards more sustainable forms of energy.



The staying-power of renewables also has important implications for a broad range of stakeholders, including the private sector. While demand and investment for fossil fuels dropped during the pandemic, renewables did not experience a similar drop in demand thanks to newly available capacity and the must-run status of renewables in many jurisdictions.

Although the COVID-19 crisis slowed down investments in renewables and threatened new projects during the first half of 2020, renewable energy sources were able to resist the shock better than those based on fossil fuels (International Energy Agency, 2021). For investors that tend to be more risk-averse, renewable energy is much more likely to avoid the likely problem of stranded assets that is faced by many fossil fuel-based facilities.

How have governments attempted to undertake a green and resilient recovery? Some of the measures include grants, loans, and tax relief directed towards clean transport, circular economy and clean energy research, development and deployment (Organization for Economic Cooperation and Development, 2020). Some governments were able to provide direct financial support to households and businesses for efficiency improvements and renewable energy installations, as well as new funding and programs to create jobs and stimulate economic activity through ecosystem restoration and the control of invasive alien species and forest conservation. Other possibilities include loans and grants for renewable energy projects; subsidies and other support for research and academic institutions, as well as private firms to further develop renewable energy



technology. The cost reductions achieved in solar and wind power have been thanks to government support, as well as continuous ‘doing’ which has led to greater efficiencies across the supply chain. Similar progress could be made in other technologies such as green hydrogen electrolyzers, carbon capture, storage and utilization, storage and efficiency measures, all of which can complement a transition towards renewable energy. Other steps include direct subsidies or tax reductions for the use of renewable technologies, including distributed generation (VividEconomics, 2021).

Given how indispensable fossil fuels still are for a vast majority of people and their energy needs, many recovery measures were still considered ‘brown’, understandably consisting of support for immediate recovery and the fuel and energy insecurity faced by many. However, a green recovery is foreseen to have longer-term impacts on a country’s energy system. An analysis of 30 countries found that a total of over 17.2 trillion USD has been committed as a stimulus as of July 2021, with a number of recovery packages including ‘green’ measures targeting sustainable recovery and building resilience. Around 4.8 trillion USD went to sectors considered to have environmental relevance—agriculture, industry, waste, energy and transport.

However, the net impact of these stimulus packages has been assessed to be overall negative on the environment. Countries in Europe and also Canada have been at the forefront, whereas others have shown some improvement but still continue to negatively impact the environment, or do not achieve the necessary scale of realignment to tackle climate change (VividEconomics, 2021). The European Union’s has put up a Recovery and Resilience Facility estimated at USD 854.55 billion in loans and grants to support its member States (European Commission, 2021). OECD countries together have committed a total of 3.2 trillion USD, of which 677 billion has a positive impact on the environment, with 320 billion assessed to have a mixed or negative impact (OECD, 2020).



Several possibilities are open to governments to incorporate green measures into their recovery packages in the current context. Actions harmonized across various sectors, along with targeted investments will be key. According to the IEA, sustainable recovery plans that rely on energy efficiency measures, accompanied by a major increase in low-carbon electricity generation, could boost economic growth, create 9 million jobs and put greenhouse gas (GHG) emissions into structural decline, while also making the energy sector more resilient and better prepared for future pandemics and crises (IEA, 2020).

Integrated urban planning can help cities connect transport and energy planning, as well as grey, blue and green infrastructure (UNEP, 2020). Aware of these needs and opportunities, local governments have also worked to identify critical actions for a sustainable recovery across three main axes: creating jobs and an inclusive economy, acting for resilience and equity, and acting for health and well-being, as well as calling on national governments, banks, and financial institutions to channel funds to help cities and other local governments achieve this goal (C40, 2020).



# CASE STUDIES: ACCELERATING THE GREEN RECOVERY

The purpose of these case studies is to highlight the efforts made by emerging economies, at the national and sub-national level, towards promoting the use of renewable energy in their respective energy systems, and some of the steps they have undertaken during their own post-COVID recoveries, whether by promoting specific technologies or innovative finance approaches. While many have chosen to focus recovery efforts on the fossil fuel industry, there are also a number of initiatives at the regional levels that focus on renewables in particular that are bound to impact green recovery efforts. The focus is on the national and sub-national governments of the countries of Argentina, Indonesia and Kenya.

## Argentina

### Regional and national outlook

The widespread availability of natural resources for renewable energy in Latin America and the Caribbean has been repeatedly highlighted by investors, which is encouraging for undertaking a green recovery

agenda. Many Latin American countries such as Brazil are already known for the large share of hydropower in their electricity generation mixes. Other renewable sources such as wind and biofuels have seen a lot of investment in recent years (IRENA, 2016). In Argentina, the electricity generation mix is dominated by natural gas, followed by a significant share of hydropower and growing shares of wind and solar PV (IEA, 2019). The country has a 100 percent electrification rate—however, reliability remains an issue due to capacity constraints (IFC, 2017).

Argentina has been keen to spur the development of renewable energy sources such as wind and solar photovoltaics (PV), with a particular focus on distributed generation. Two major laws were passed for encouraging the promotion of renewable energies. Law N°27191 was adopted in 2015 in order to adapt the overall regulatory framework to diversify the energy mix at the national level, which set a mandatory national target of a 20 percent share of renewable energy in total energy demand by 2025. Support measures include tax incentives, other

incentives to develop the local value chain, establishing clear procurement mechanisms, and creating a fund to finance and guarantee investment (Ministerio de Energía y Minería, 2016). Another law (N°27424) related to distributed generation was also adopted in 2017, enabling electricity consumers to become producers of renewable energy i.e. 'prosumers'. Argentina also implemented a carbon tax in 2018, however this covers only 20 percent of the country's GHG emissions and several fuels are exempt. Still, it is a key policy measure that with improvements can greatly contribute to the transition towards renewable energy. Although Argentina's post-COVID recovery plans have focused more on reviving and keeping afloat the oil and gas industry, a number of sub-national initiatives on promoting renewable energy continue (Climate Action Tracker, 2021).

### Sub-national initiatives

In addition to enabling frameworks at the national level, subnational governments are also actively working towards developing renewables in their own jurisdictions. The Argentinian Chamber of Renewable Energies (CADER) launched a process of federal dialogues that brought together 16 sub-national government

representatives, public officials from all levels, and the private sector, to discuss issues related to finance, industry, bioenergy, and distributed generation (Camara Argentina de Energías Renovables, 2020).

An example is the Province of Santa Fe, for which decentralized generation from renewable energy sources is at the center of its climate and energy agenda and which has been working under the 'Prosumidores' ('prosumers') program since 2015. The province has been debating a law to elevate the program, promoting research, development, and self-production of new energy sources and facilitate this process by mandating that service providers enable this transition. In addition, all new constructions of public buildings should envisage decentralized generation on their premises (Energía Estratégica, 2020).

The Province of Entre Ríos is also evaluating the possibility of its own renewable energy and self-consumption law (R2820, 2020). In order to reach the national objective of 1 GW of decentralized renewable energy generation in 2030, the province is seeking to advance its own local projects.

Two cities in the Santa Fe province, Rosario and Avellaneda, have been pushing forward a number of programs at the local government level in the renewable energy sphere. In Avellaneda, a number of private and public projects have allowed the city to achieve a 25 percent renewable share in the local energy mix (Daring Cities, 2020). Other projects that could allow it to advance towards a full 100 percent renewable energy mix include energy efficiency in public lighting and municipal buildings, and the installation of bio-digesters with industrial waste streams.

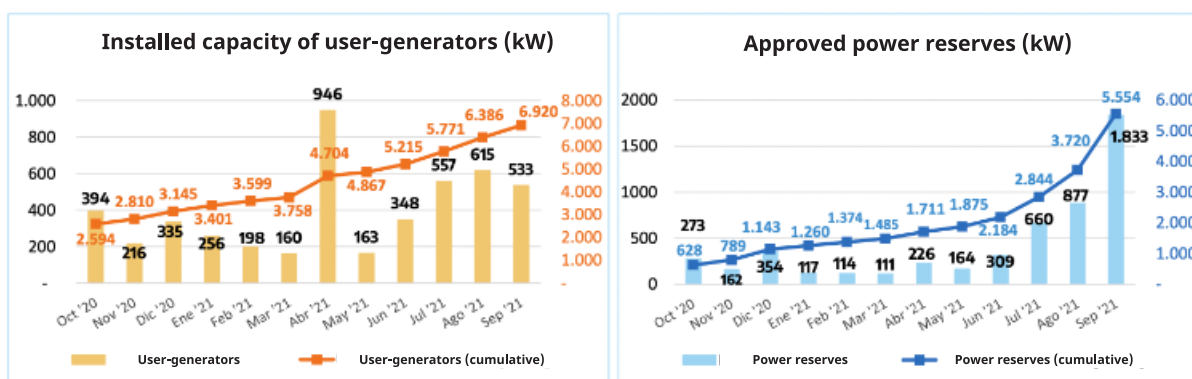
In Rosario, the public sector has taken the lead, such as installing solar thermal technology in all new municipal buildings, and facilitating access to solar PV panels and allowing 'prosumers' to sell electricity back to the grid through the 'Prosumidores' program. Rosario also partakes in the 'Green Seal' program that accompanies small and medium enterprises (SMEs) in the technical implementation of renewable solutions and attracting investment. Some municipal banks also provide credit lines in order to finance RE projects in SMEs, cooperatives and civil associations (Daring Cities, 2020).

### Technical & financial solutions

In Argentina, distributed solar power features prominently. Distributed

generation through RE sources can contribute greatly to enhanced climate mitigation and resilience, especially when combined with storage technologies. By shifting to micro- or mini-grids, the impacts on communities of shocks to the electricity grid can be minimized. The spillover effects, for example enabling the creation of a cold chain, can benefit other areas such as public health as well, particularly for remote or underserved communities. By September 2021, Argentina had reached 6.9 MW of distributed generation, despite the disruption caused by the pandemic (see Figure 1).

Over 600 projects were completed and over 300 awaiting approval, including residential and commercial 'prosumers'. While the number of residential prosumers is higher, the installed capacity is lower than those of commercial installations. The province of Cordoba accounted for the largest share, with 4.2 MW of capacity installed (Government of Argentina, 2021). Only nine sub-national governments are working under this framework, with other provinces acting under their own policies and frameworks, such as Santa Fe, with an additional at least 1 MW of installed capacity. Overall, these numbers indicate that the sector is growing in Argentina, and is in need of greater investment.



**6,920 kW**

installed and connected to the grid through a bi-directional meter

**5,554 kW**

Power reserved by the distributor, of which 964 kW is awaiting connecting to the meter

Source: Adapted from Government of Argentina (2021)

**Figure 1: Installed capacity of prosumers in Argentina**

Biofuels also play a significant role in Argentina’s energy transition to replace certain liquid fossil fuels. In October 2020, the Santa Fe legislature passed the Program for Provincial Migration to Biodiesel in Public Transportation (El Litoral, 2020). The law establishes the compulsory use of biodiesel in public vehicles and promotes their use in freight transport, agriculture, logistics, public works, and public administration through measures such as tax incentives.

The province already has a high potential for biofuel, with 18 plants producing 3,473,600 tons per year, as well as two bioethanol plants in Villa Ocampo and Avellaneda (Daring Cities, 2020). The use of biofuels in public transportation has already been successful in Rosario, the first municipality to adopt biodiesels for the public transport company (Daring Cities, 2020).

Argentina has been pushing for green hydrogen<sup>1</sup> technologies as well (Schneider, 2021). A consortium led by a subsidiary branch of Yacimientos Petrolíferos Fiscales (YPF)—the federal, vertically integrated, publicly-owned energy company—is the first one in the Latin American region that aims at creating a collaborative workspace amongst enterprises in the value chain of hydrogen. In fact, hydrogen development is a key part of the national recovery strategy. Possible approaches include starting distributed production, management, and utilization of hydrogen in provinces such as Patagonia and to supply the most populated areas reaching Buenos Aires in order to ensure reliable demand (Aprea & Bolcich, 2020).

<sup>1</sup> Green hydrogen i.e. hydrogen produced through electrolysis and renewables-based electricity, can be a promising solution for hard-to-decarbonize sectors such as certain industrial applications, or for heavy transportation and so on.

## Indonesia

### Regional & national outlook

The countries of the Association of Southeast Asian Nations (ASEAN) have been working towards the goal of 23 percent renewables in the energy matrix by 2025, under the ASEAN Plan of Action for Energy Cooperation (APAEC) (ASEAN, 2020). The pandemic has been a huge shock, deeply affecting the energy sector in the region, weakening the demand for renewable energy and impeding the realization of some renewable energy projects.

Nonetheless, ASEAN countries and cities have reaffirmed their commitment to renewable energies, particularly in face of the high energy dependence on imported fossil fuels in the region, and their proven unreliability of supply chains during crises. Green recovery packages in the region feature renewables at their core. Cities have been encouraged to adopt climate-friendly programs in order to improve air quality and achieve climate commitments.

Despite the economic and public health uncertainties, renewables have shown progress in the ASEAN region—however, many stimulus packages were understandably focused on immediate assistance

measures rather than a towards a longer-term strategy (ASEAN, 2020).

Indonesia in particular is committed to renewable energy and has been exploring diverse energy sources. Indonesia adheres to ASEAN targets, as well as its own, such as the implementation of 30 percent biodiesel blending by 2025 in the transport, power, industry, and commercial sectors, and the target for an RE installed capacity of 45 GW by 2025 and 168 GW by 2050 (ACCEPT, n.d.).

During the lockdown phase, the Indonesian government made efforts to ensure energy availability and affordability (Antara News, 2020). By mid-2020, new regulations on renewable energy helped overcome several regulatory obstacles and make investment more attractive. Moreover, the solar industry has been included in the post-COVID-19 recovery plans, including promoting its development through tax incentives and other stimulus measures (Suharsono & Lontoh, Indonesia's Energy Policy Briefing, 2020).

Indonesia has also been tapping into international support for developing further projects. In July 2020, Indonesia's Ministry of Energy and Mineral Resources (MEMR) finalized a

new scheme to attract private investment in RE sources, as well as strategies to enhance integration and power system operation (IEA, 2020). Other collaborative efforts include capacity building with international organizations and experts (MEMR, 2020). There is also ongoing work focused on island economies (DEPA, 2019). Partnerships with European partners have continued, including in the energy transition and green recovery spheres (EEAS, 2021).

However, due to COVID-19, several renewable energy development projects in Indonesia have been hampered. Many that were in the construction phase and were originally planned for completion in 2020 were postponed to 2021. There has also been some delay in disbursing funds from banks (Suharsono, Lontoh, & Maulidia, 2021). COVID-19 has also affected the government's decision and implementation of regulations. Due to regulatory uncertainties and disturbance in the government operations, 27 out of 75 power purchase agreements (PPAs) in renewable energy signed between 2017 and 2018, have not reached financial closing and five were terminated. This has also affected investor sentiment due to the uncertainty created (Suharsono, Lontoh, & Maulidia, 2021).

## Sub-national initiatives

Indonesia's region of West Nusa Tenggara has been working on electrification and climate change mitigation and adaptation for several years. Although the province already has a high electrification ratio, kerosene remains the main cooking fuel, affecting the health and quality of life of its residents. The island is working under its Regional Energy Plan (RUED) for efficiently developing renewable energy potential, which is high in solar and wind (Islami & Aditya, 2020). Some of the local level projects in place include household-scale biogas, commercial-scale photovoltaic energy, and a mini-hydro plant. The local government has adopted tax incentives and facilitated the licensing process to enable investment and implementation (Daring Cities, 2020).

In the Cirata reservoir and dam in the province of West Java, a solar floating power plant is under development. Floating solar panels can allow for the installation of solar power in areas where land availability is a concern, and also provides some benefits such as reducing evaporation (Bellini, 2021). On a smaller scale, the city of Balikpapan in the East Kalimantan province has been undertaking a waste-to-energy project (Daring Cities, 2020).



Geothermal energy is also a focus of the national government, with some major projects being undertaken, such as one on the island of Java meant to increase its installed capacity of geothermal electricity by 110 MW (Asian Development Bank, 2020). This project is part of an effort to put the energy transition at the core of the country's green recovery, reducing CO<sub>2</sub> emissions by over 700,000 tons per year and shifting the Java-Bali electricity grid to cleaner, environmentally friendly sources. The success of this project is key for further attracting much-needed private investment in geothermal energy (MEMR, 2020).

Moreover, as part of Indonesia's green recovery, the Ministry of Energy and Mines announced in June 2020 a \$1 billion solar project, targeting 1GWp of annual installations on rooftop solar for households receiving electricity subsidies. The program targets low-income households and could create up to 22,000 green jobs and contribute to national targets. Project preparation and capacity building are already underway, although the project is expected to begin in 2021 (Ho, 2020).

### Technical & financial solutions

A number of projects are in the works that are designed to help Indonesia

achieve its climate goals, including renewable energy projects related to hydropower, solar energy, and waste-to-energy at different stages along the project development cycle (Kementerian PPN/Bappenas, 2019). Distributed generation has potential as well—for example, analysis has shown that in the City of Semarang, the solar energy potential from rooftops capacity could contribute to 40.87 percent of the energy needs of the city, and reduce about 1,394 tCO<sub>2</sub> per year (Widodo, Purwanto, & Hermawan, 2020).

Indonesia also relies on an innovative tool to help attract and manage climate finance. In October 2019, the government created Indonesia's Environmental Fund Management Agency (BPDLH) under the Ministry of Finance, a public service agency with the role of managing local and international funds for climate-related projects. The institution is capable of managing resources and implementing GHG reduction projects at all levels (Reuters, 2019). It is designed to be more autonomous than government institutions, but more regulated than state-owned enterprises. The BPDLH can mobilize both internal budget and external sources as non-tax revenue, without passing by the state treasury, which allows for flexibility and autonomy (Mafira, Mecca, & Muluk, 2020).

In early November 2020, Indonesia launched the second Green Sukuk Series—green bonds that are Sharia-compliant, meant to raise capital and share the financing risks of eligible green projects that promote the transition to a low-emissions and climate-resilient economy (UNDP, 2020). These projects include transportation, railway infrastructure, energy, renewable energy, waste management, water management, and agriculture. This commitment makes Indonesia the only Green Sukuk Retail publisher in the world to date (Suharsono, Lontoh, & Maulidia, 2021).



## Kenya

### Regional & national outlook

According to IRENA's Global Energy Outlook, Sub-Saharan Africa could meet 67 percent of its power generation from clean renewable energy sources. Certain policy interventions could facilitate the process, such as increasing demand-side management, adding storage, promoting regional interconnections, and strengthening the grid (IRENA, 2020). Despite the pandemic, the African renewable energy sector was quite active in 2020.

Achieving universal access to electricity is key in the African Union's (AU) Agenda 2063, and the achievement of SDGs by 2030 (International Renewable Energy Agency, 2020). A number of initiatives are underway, including creating more robust power markets and encouraging cross-border trades of renewable energy (IRENA, n.d.).

Since late 2018, Kenya has been working under its National Electrification Strategy to ensure 100 percent electrification by 2022, combining both grid-connected and decentralized technologies (Ministry of Energy, 2018). For achieving this goal, Kenya largely relies on geothermal, aiming to achieve 2.3 GW of installed capacity by 2030, although

a variety of renewable energy sources are being explored. Indeed, Kenya has undertaken a number of policy measures that have created an enabling framework for promoting renewable energy technologies. These include a feed-in tariff (FiT) policy, the creation of standardized PPAs for RE projects, public-private partnerships and guidelines for grid connection for small RE projects (Daring Cities, 2020).

International cooperation has also played a role, for example with European partners (African Union, 2020). Through the Programme for Infrastructure in Africa (PIDA), both commissions committed to following recommendations from the AU-EU Task Forces on Digital Economy, Transport and Connectivity, and Sustainable Energy Investment as vehicles for collaboration. African countries also agreed to enhance cooperation on geothermal development (UNEP, 2020). Kenya in particular is keen on geothermal (Burkhardt & Herbling, 2021).

### Sub-national initiatives

Although the pandemic slowed down investments and economic activity overall, existing and new projects have continued to move forward. Counties across Kenya are pursuing renewable energy initiatives both on and off the grid, combining publicly

and privately led actions to achieve national targets. The counties of Kisumu and Nakuru for example also recognize the need for improved data, including a county-level database on renewable energy sources and policies, as well as awareness-raising and capacity-building at the local level as key enablers for county-level action (Daring Cities, 2020).

Kisumu County had been working on a 10-point agenda to promote investment in priority areas, including solar mini-grids, bioenergy for clean cooking, improving energy efficiency and energy audit capabilities, and the creation of a center for capacity building on renewable energy (Daring Cities, 2020). As an example, the Kalobeyei settlement for refugees is supplied by two solar-power mini-grids for the use of the refugee and host settlements (GIZ, 2015). To this end, the county has been working with public and private partners including for the Kora-Soin dam, the greater uptake of solar power by private industries, the establishment of high-voltage power lines, and for expanding the region's geothermal capacity. A solar power plant in Kisumu is also expected to be operational by 2023.

### Technical & financial solutions

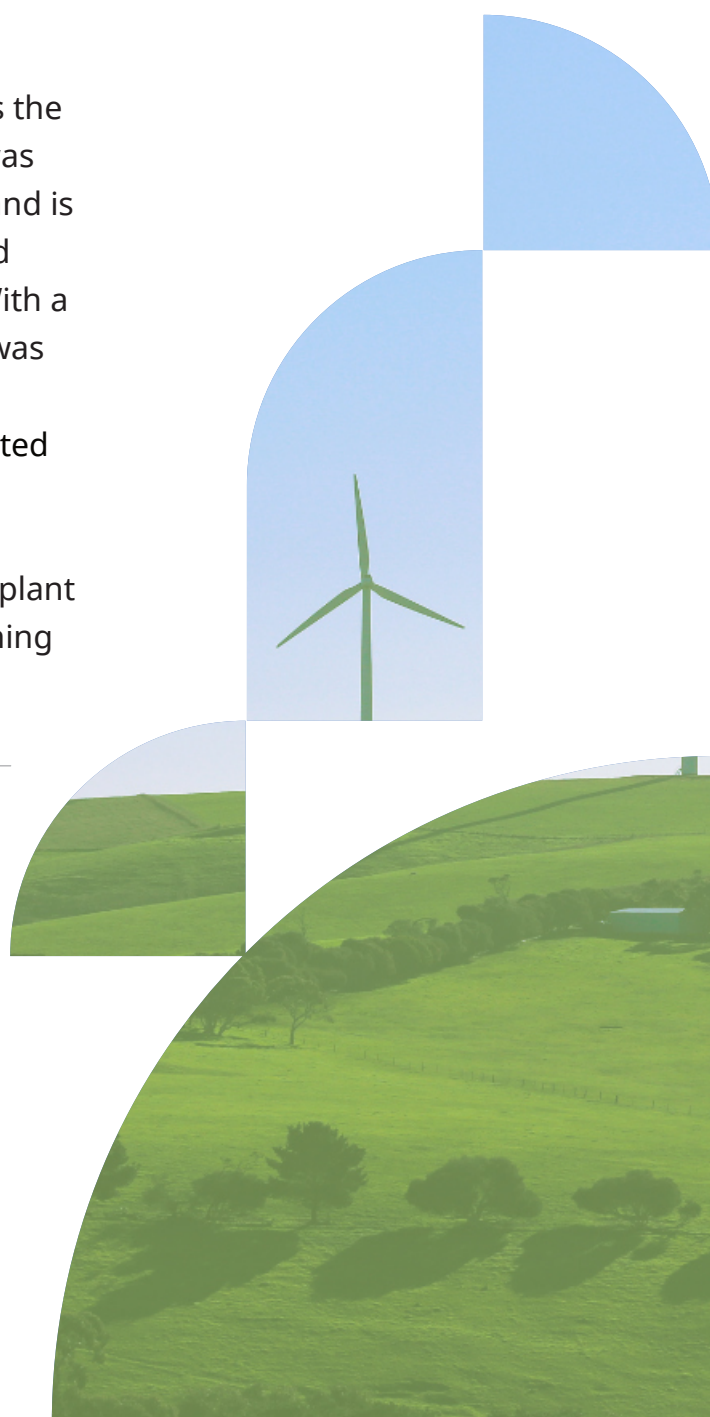
In order to achieve the National

Energy Strategy, the Kenyan Electricity Generation Company (KenGen) and the Nairobi Metropolitan Services agreed on a project to build a waste-to-energy plant at the Dandora landfill that has been presenting a serious environmental and sanitary concern (Construction Review Online, 2021). The project is aimed at generating large-scale electricity from waste for the Nairobi metropolitan region and feeding it into the national grid, while managing solid waste at the same time. This also opens a new income stream for the city, and the utility company benefits by diversifying its energy sources.

Geothermal energy has also been a point of focus for Kenya, as the potential in the region is quite vast owing to its geographical location. Kenya's Geothermal Development Company completed the construction of the Menengai Geothermal Project in Nakuru County with funding from the African Development Bank (Construction Review Online, 2021). The plant is estimated to produce 672 MWe which will enable the connection of 500,000 households to the national grid and reduce CO<sub>2</sub> emissions by about 600,000 tons in 2022. This project positions Kenya as a leading geothermal producer in Africa and the eighth largest producer of geothermal energy

in the world\_(Further Africa, 2021). Almost 40 percent of Kenya’s electricity comes from geothermal sources (Kushner, 2021). Construction of another project at Barigo-Silali with an estimated capacity of 3 GW has also commenced (Richter, 2020).

Kenya has also advanced with previous projects in more conventional generation, such as the Kipeto wind power farm which was fully commissioned in July 2021 and is now Kenya’s second-largest wind farm (Renewables Now, 2021). With a capacity of 100 MW, the project was estimated to supply electricity to 250,000 households and is expected to contribute significantly to Kenya’s *Vision 2030* and Big Four Agenda. The Kaptis hydropower plant is also scheduled for commissioning in 2022 (Afrik 21, 2020).



# THE WAY FORWARD: COORDINATED LOCAL AND GLOBAL ACTION

Undertaking a green and resilient recovery is a good opportunity to tackle two crises simultaneously—the economic crisis caused by COVID-19, and the climate emergency. However, a baseline for achieving this is strong political will from national, regional and local leadership, a long-term vision, and a commitment of resources towards these goals. The latter point is particularly relevant when it comes to the gap between Global North and Global South countries, as undertaking a green and resilient recovery is more feasible for some with existing resources, whereas others need closer coordination and support.

It is also crucial that any solutions pioneered during this time are scaled up in order to ensure the benefits are built upon continuously, can diffuse across different areas, and are sustainable over the long term. Integrating a larger share of renewables can also require investing in improving grid capacity and flexibility and storage options that can increase the system's resilience overall. Distributed generation can also be an attractive option in areas where grid extensions are not always feasible, which can improve a

community's resilience and expand its economic opportunities.

As both crises are global and require collective action, international cooperation is also key both for the exchange of resources, including financial, and knowledge and experiences. According to some analyses, if around 10 percent of the stimulus packages were invested every year between 2020 and 2024, amounting to around 1.4 trillion USD per year, there would be enough capital to fund the energy transition and set the world onto the path for the 1.5°C goal (Andrijevic & Rogelj, 2020). In order to seize this opportunity, both public and private investment is necessary, together with urgent policy reforms and a renewed energy strategy that allows coordination between countries, consolidating markets, and understanding the comparative advantages of each (IADB, 2020). This entails looking at the role of the public sector in recovery and finding innovations to best integrate investment, partnerships, and solutions.

A number of countries have undertaken an explicitly 'green'

recovery, however this has posed a challenge for low- and middle-income countries, where the access to finance is not as smooth, and the precarity created by COVID-19 was more pronounced and required immediate remedies, including support to fossil fuels. However, some countries have used innovative finance mechanisms to facilitate their transition, such as Indonesia with the Green Sukuk initiative. For other low- to middle-income countries, another financial options include debt swaps<sup>2</sup>, which are particularly relevant for countries already facing a debt crisis, and can help them tackle their debt, climate and biodiversity challenges simultaneously (Steele & Patel, 2020).

Another avenue of support is through multilateral agencies. The World Bank for example has called for a shift towards low-carbon energy and expanding energy access as key steps for reducing emissions and ensuring sustainable development. Its Climate Change Action Plan 2021-2025 is underway, mixing long-term climate mitigation and adaptation goals with the imperative of short-term recovery strategies, involving job creation and economic growth (World Bank, 2018). The Asian Development Bank has also

<sup>2</sup> Debt swaps are financial transactions in which a portion of a country's external debt is relieved in exchange for local investments in a defined investment area. This entails exchanging an existing debt contract for a new one and 'writing down' or 'discounting on' the value of the original contract. As a result, parties swap unproductive debt for productive investment.

put forth guidance for governments on the concept of a green recovery, advocating for the need for recovery packages to push for a low-carbon and resilient economic transition (ADB, 2020). The European Investment Bank also has several programs, including one focused on the green recovery in cities (European Committee of the Regions, 2020). In partnership with the African Export-Import Bank, EUR 300 million has been committed to help African countries respond to COVID-19—of this, roughly a quarter is reserved for projects meant to improve climate mitigation and adaptation actions, which can greatly contribute to a 'green recovery' efforts (EIB, 2020). Aid agencies for some countries have also reoriented their spending to bolster a green recovery from COVID-19 (International Climate Initiative, n.d.).

Ultimately, it is up to governments to show the political will and initiative to undertake a 'green' recovery, for which they can reap the benefits over the long term and across multiple sectors. Investing in renewable energy sources and technologies can itself be a major pillar for a green recovery, simultaneously improving the energy situation, reducing emissions, creating employment and skills that are valuable over the long term, and improving resilience for many communities. Certain general

factors can make attracting investment easier, such as an abundance of renewable energy potential, clear policy direction matched with local expertise, and regulatory certainty to earn the confidence of investors (Frankfurt School-UNEP Centre/BNEF, 2020). There are a number of policies and regulatory approaches governments can also undertake during the recovery phase to channel more funds into green and resilient measures, and ensure sustainability over the long term.

The International Monetary Fund (IMF) suggests that public officials should make projects “shovel-ready” in order to attract capital flows. It also suggests some policy measures that policymakers can implement to help promote a green recovery. These include the active support of green activities through public investment as well as public works programs, including renewable energy and grid modernization, other ‘climate-smart’ technologies such as batteries, hydrogen, carbon capture, storage and utilization (CCUS), adaptation actions such as flood protection, and generally avoiding carbon-intensive investments. In cases where support for ‘brown’ activities is unavoidable, this support should be made conditional on making progress on climate action, such as emissions

reduction targets. An effective price on carbon is also a key policy tool, as is the need for providing green financing and improving the assessment of the climate impacts of stimulus measures (International Monetary Fund, 2020).

Other ‘archetypical’ measures can include strings-attached bailouts and loans or grants actively targeting green projects, as well as subsidies or tax reductions for green technologies such as electric vehicles, and for improved research and development. Governments should also avoid deregulating environmental regulations—measures which have been used as stimulus measures in some cases—as the long term impacts could be severe; instead, they should reinforce these regulations where possible (VividEconomics, 2021).

Other enabling factors can include greater regional integration to take advantage of differing resource endowments, modernizing existing infrastructure, and leapfrogging where possible, such as in improving access to energy services. Enhancing digitalization to improve monitoring and energy and system efficiency, and transforming fossil fuel technologies into more sustainable industries can also contribute (Inter-American Development Bank, 2020).



In essence, a long-term vision is needed to be able to align multiple policy priorities within a relatively short amount of time, and allow for the development of solutions that can cut across these priorities. Investing in renewable energy can tackle multiple such priorities, putting the world on a path towards achieving the objective of the Paris Agreement and other international commitments calling for net-zero emissions, climate neutrality and enhanced climate resilience. International, regional and sub-national cooperation will remain essential to tackle both global challenges simultaneously.

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# REFERENCES

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- ACCEPT. (n.d.). *RE and EE Targets*. Retrieved from <https://accept.aseanenergy.org/re-ee-targets>
- African Union. (2020, February). *Joint Communiqué: 10th African Union Commission – European Commission Meeting*. Retrieved from <https://au.int/en/pressreleases/20200227/joint-communique-10th-african-union-commission-european-commission-meeting>
- Afrik 21. (2020, April). *KENYA: EAIF and Finnfund finance 15 MW Kaptis Hydroelectric Project*. Retrieved from <https://www.afrik21.africa/en/kenya-eaif-and-finnfund-finance-15-mw-kaptis-hydroelectric-project/>
- Andrijevic, M., & Rogelj, J. (2020, October). *Guest post: How the global coronavirus stimulus could put Paris Agreement on track*. Retrieved from CarbonBrief: <https://www.carbonbrief.org/guest-post-how-the-global-coronavirus-stimulus-could-put-paris-agreement-on-track>
- Antara News. (2020). *Govt. prioritizes 4 sectors for guaranteed energy supply amid pandemic*. Retrieved from <https://en.antaraneews.com/news/152574/govt-prioritizes-4-sectors-for-guaranteed-energy-supply-amid-pandemic>
- Aprea, J. L., & Bolcich, J. (2020). The energy transition towards hydrogen utilization for green life and sustainable human development in Patagonia. *International Journal of Hydrogen Energy*, 25627-25645.
- ASEAN. (2020, November). *COVID-19 vs ASEAN Energy Sector: Renewables (Q3)*. Retrieved from <https://aseanenergy.org/covid-19-vs-asean-energy-sector-renewables-q3/>
- ASEAN. (2020). *ASEAN Plan of Action for Energy Cooperation*. Retrieved from <https://aseanenergy.org/asean-plan-of-action-for-energy-cooperation-apaec/#:~:text=Aspirational%20target%20to%20increase%20the,and%20utilisation%20within%20the%20region.>
- Asian Development Bank [ADB]. (2020, August). *Indonesia: Geothermal Power Generation Project*. Retrieved from <https://www.adb.org/projects/52282-001/main>
- Asian Development Bank [ADB]. (2020). *Covid-19 Recovery: A Pathway to a Low-Carbon and Resilient Future*. Asian Development Bank.
- Bapna, M., & Gorissen, N. (2020). *5 Pillars for a Green and Resilient Recovery from Covid-19*. Retrieved from World Resources Institute: <https://www.wri.org/insights/5-pillars-green-and-resilient-recovery-covid-19>
- Bellini, E. (2021, August). *Work begins on 145 MW floating solar plant in Indonesia*. Retrieved from PV Magazine: <https://www.pv-magazine.com/2021/08/05/work-begins-on-145-mw-floating-solar-plant-in-indonesia/>
- Burkhardt, P., & Herbling, D. (2021, July). *The World's No. 1 in Geothermal Electricity, Kenya Aims to Export Its Know-How*. Retrieved from Bloomberg: <https://www.bloomberg.com/news/features/2021-07-19/kenya-aims-to-double-geothermal-capacity-by-2030>
- C40. (2020). *C40 Mayors' Agenda for a Green and Just Recovery*. Retrieved from <https://www.c40.org/other/agenda-for-a-green-and-just-recovery>
- Camara Argentina de Energías Renovables. (2020). *Diálogo Federal por una Argentina Renovable lanzó cuatro mesas de trabajo sobre energías renovables*. Retrieved from <https://www.cader.org.ar/dialogo-federal-por-una-argentina-renovable-lanzo-cuatro-mesas-de-trabajo-sobre-energias-renovables/>
- CarbonBrief. (2020, June). *Coronavirus: Tracking how the world's 'green recovery' plans aim to cut emissions*. Retrieved from CarbonBrief: <https://www.carbonbrief.org/coronavirus-tracking-how-the-worlds-green-recovery-plans-aim-to-cut-emissions>
- Climate Action Tracker. (2021). *Argentina - Policies and Actions*. Retrieved from <https://climateactiontracker.org/countries/argentina/policies-action/>
- Construction Review Online. (2021, August). *Construction of Menenga? Geothermal Power Plant in Kenya complete*. Retrieved from <https://constructionreviewonline.com/news/kenya/construction-of-menengai-geothermal-power-plant-in-kenya-complete/>
- Construction Review Online. (2021, August). *Kenya: A waste-to-energy plant to be constructed at Dandora, Nairobi*. Retrieved from <https://constructionreviewonline.com/news/kenya/kenya-a-waste-to-energy-plant-to-be-constructed-at-dandora-nairobi/>
- Danish Environmental Protection Agency [DEPA]. (2019). *Partnership Document and Application for Sustainable Island Initiative in Energy and Environment*. Retrieved from <https://um.dk/~media/um/english-site/documents/danida/about-danida/danida%20transparency/documents/u%2037/2020/ssc%20indonesia%20energy.pdf?la=en>

Daring Cities. (2020). *100% Renewable Energy Roadmaps - Contributing to the Energy Transition*. Retrieved from <https://daringcities.org/resources/100-renewable-energy-roadmaps-contributing-to-the-global-energy-transition/>

Daring Cities. (2020). *Drivers to Scale Up Renewable Energy Projects*. Retrieved from <https://daringcities.org/resources/drivers-to-scale-up-renewable-energy-projects/>

Daring Cities. (2020). *Post-COVID-19 Recovery: How to Incorporate Innovation and Green Stimulus in South America's Public Management Systems*.

Daring Cities. (2020). *Test Your Pitch*. Retrieved from <https://daringcities.org/resources/test-your-pitch/>

Deutsche Gesellschaft für Internationale Zusammenarbeit [GIZ]. (2015). *Supporting refugees and host communities in Kenya*. Retrieved from <https://www.giz.de/en/worldwide/32846.html>

El Litoral. (2020, October). *Santa Fe apuesta al uso de los biocombustibles*. Retrieved from [https://www.ellitoral.com/index.php/id\\_um/265036-santa-fe-apuesta-al-uso-de-los-biocombustibles-ley-para-promover-el-desarrollo-y-su-uso-en-el-transporte-politica.html](https://www.ellitoral.com/index.php/id_um/265036-santa-fe-apuesta-al-uso-de-los-biocombustibles-ley-para-promover-el-desarrollo-y-su-uso-en-el-transporte-politica.html)

Energía Estratégica. (2020, July). *Santa Fe plasma en ley los beneficios para generación distribuida con energías renovables*. Retrieved from <https://www.energiaestrategica.com/santa-fe-plasma-en-ley-los-beneficios-para-generacion-distribuida-con-energias-renovables/>

European Commission. (2021). *Recovery and Resilience Facility*. Retrieved from [https://ec.europa.eu/info/funding-tenders/find-funding/eu-funding-programmes/recovery-and-resilience-facility\\_en](https://ec.europa.eu/info/funding-tenders/find-funding/eu-funding-programmes/recovery-and-resilience-facility_en)

European Committee of the Regions. (2020, October). *EIB support to cities' green recovery*. Retrieved from [https://europa.eu/regions-and-cities/programme/sessions/1429\\_en](https://europa.eu/regions-and-cities/programme/sessions/1429_en)

European External Action Service [EEAS]. (2021, May). *EU-Indonesia Cooperation Publication 2021*. Retrieved from [https://eeas.europa.eu/delegations/madagascar/97723/eu-indonesia-cooperation-publication-2021\\_ka](https://eeas.europa.eu/delegations/madagascar/97723/eu-indonesia-cooperation-publication-2021_ka)

European Investment Bank [EIB]. (2020, August). *EIB and Afreximbank direct EUR 300m of support to African COVID response*. Retrieved from <https://www.eib.org/en/press/all/2020-218-eib-and-afreximbank-direct-eur-300m-of-support-to-african-covid-response.htm>

Fattouh, B., & Economou, A. (2020, May). *Is the worst of the oil crisis behind us?* Retrieved from The Oxford Institute for Energy Studies.

Frankfurt School-UNEP Centre/BNEF. (2020). *Global Trends in Renewable Energy Investment 2020*. Retrieved from <https://www.fs-unep-centre.org/global-trends-in-renewable-energy-investment-2020/>

Further Africa. (2021, May). *Kenya eyes more billions to expand geothermal energy*. Retrieved from <https://furtherafrica.com/2021/05/24/kenya-eyes-more-billions-to-expand-geothermal-energy/>

Ghaliya, G. (2020, September). *French investors' appetite for Indonesia's energy sector remains high amid pandemic*. Retrieved from The Jakarta Post: <https://www.thejakartapost.com/news/2020/09/23/french-investors-appetite-for-indonesias-energy-sector-remains-high-amid-pandemic.html>

Government of Argentina. (2021, September). *Reportes de Avance - Implementación de la Ley 27.424*. Retrieved from <https://www.argentina.gob.ar/economia/energia/generacion-distribuida/que-es-la-generacion-distribuida/reportes-de-avance-implementacion-de-la-ley-27424>

Ho, S. (2020, June). *Indonesia Covid-19 Recovering Includes Planning US\$1 Billion Solar Energy Plan*. Retrieved from <https://www.greenqueen.com.hk/indonesia-covid-19-recovering-includes-planning-us1-billion-solar-energy-plan/>

Inter-American Development Bank. (2020, August). *Políticas de recuperación verde y potenciales aplicaciones en América Latina*. Retrieved from <https://blogs.iadb.org/energia/es/politicas-de-recuperacion-verde-y-potenciales-aplicaciones-en-america-latina/>

International Climate Initiative. (n.d.). *Corona Response Package*. Retrieved from <https://www.international-climate-initiative.com/en/coronaresponse>

International Energy Agency [IEA]. (2019). *Key energy statistics (Argentina)*. Retrieved from <https://www.iea.org/countries/argentina>

International Energy Agency [IEA]. (2020, July). *Indonesia and IEA deepen cooperation on electricity and renewables to advance energy transitions*. Retrieved from <https://www.iea.org/news/indonesia-and-iea-deepen-cooperation-on-electricity-and-renewables-to-advance-energy-transitions>

International Energy Agency [IEA]. (2020, July). *Sustainable Recovery*. Retrieved from [https://iea.blob.core.windows.net/assets/C3de5e13-26e8-4e52-8a67-b97aba17f0a2/Sustainable\\_Recovery.pdf](https://iea.blob.core.windows.net/assets/C3de5e13-26e8-4e52-8a67-b97aba17f0a2/Sustainable_Recovery.pdf)

International Energy Agency [IEA]. (2020). *Global Energy Review 2020*. Retrieved from <https://www.iea.org/reports/global-energy-review-2020>

International Energy Agency [IEA]. (2020). *World Energy Investment 2020*. Retrieved from <https://www.iea.org/reports/world-energy-investment-2020>

International Energy Agency [IEA]. (2021). *Global Energy Review 2021*. Retrieved from <https://www.iea.org/reports/global-energy-review-2021>

International Energy Agency [IEA]. (2021). *World Energy Investment 2021*. Retrieved from <https://www.iea.org/reports/world-energy-investment-2021>

International Finance Corporation [IFC]. (2017). *A New Dawn: Argentina Taps Into Its Renewable Energy Potential*. Retrieved from [https://www.ifc.org/wps/wcm/connect/news\\_ext\\_content/ifc\\_external\\_corporate\\_site/news+and+events/news/argentina-taps-into-its-renewable-energy-potential](https://www.ifc.org/wps/wcm/connect/news_ext_content/ifc_external_corporate_site/news+and+events/news/argentina-taps-into-its-renewable-energy-potential)

International Monetary Fund [IMF]. (2020). *Greening the Recovery*. Retrieved from <https://www.imf.org/en/Topics/climate-change/green-recovery>

International Renewable Energy Agency [IRENA]. (2016). *Renewable Energy Market Analysis: Latin America*. Retrieved from <https://www.irena.org/publications/2016/Nov/Renewable-Energy-Market-Analysis-Latin-America>

International Renewable Energy Agency [IRENA]. (2018). *Global Energy Transformation*. Retrieved from [https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2018/Apr/IRENA\\_Report\\_GET\\_2018.pdf](https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2018/Apr/IRENA_Report_GET_2018.pdf)

International Renewable Energy Agency [IRENA]. (2020, April). *African Union and IRENA to Advance Renewables in Response to COVID-19*. Retrieved from <https://www.irena.org/newsroom/pressreleases/2020/Apr/African-Union-and-IRENA-to-Advance-Renewables-in-Response-to-Covid19#:~:text=Addis%20Ababa%2C%20Ethiopia%2C%2016%20April,Africa's%20response%20to%20Covid%2D19>

International Renewable Energy Agency [IRENA]. (2020, April). *Global Renewables Outlook: Energy transformation 2050*. Retrieved from <https://www.irena.org/publications/2020/Apr/Global-Renewables-Outlook-2020>

International Renewable Energy Agency [IRENA]. (2020, September). *Energy Innovation for a Green Recovery in Africa*. Retrieved from <https://www.irena.org/newsroom/articles/2020/Sep/Energy-Innovation-for-a-Green-Recovery-in-Africa>

International Renewable Energy Agency [IRENA]. (2021). *World Energy Transitions Outlook*. Retrieved from <https://www.irena.org/publications/2021/Jun/World-Energy-Transitions-Outlook>

International Renewable Energy Agency [IRENA]. (n.d.). *Africa Clean Energy Corridor*. Retrieved from <https://irena.org/cleanenergycorridors/Africa-Clean-Energy-Corridor>

Islami, M. S., & Aditya, E. (2020, May). *Initial Status Report of Deep-Dive Region: West Nusa Tenggara Province*. Retrieved from <http://e-lib.iclei.org/publications/Published%20Initial%20Status%20Report%20of%20West%20Nusa%20Tenggara%20%281%29.pdf>

Kementerian PPN/Bappenas. (2019). *Indonesia's Sustainable Development Projects 2019-2030*. Retrieved from <https://www.un.org/esa/ffd/ffdforum/wp-content/uploads/sites/3/2019/04/Indonesias-Sustainable-Development-Projects.pdf>

Kushner, J. (2021, March). *How Kenya is harnessing the immense heat from the Earth*. Retrieved from BBC: <https://www.bbc.com/future/article/20210303-geothermal-the-immense-volcanic-power-beneath-our-feet>

Mafira, T., Mecca, B. M., & Muluk, S. (2020, April). *Indonesia Environment Fund: Bridging the Financing Gap in Environmental Programs*. Retrieved from Climate Policy Initiative: <https://www.climatepolicyinitiative.org/publication/indonesia-environment-fund-bridging-the-financing-gap-in-environmental-programs/>

Ministerio de Energia y Minería. (2016). *Energías Renovables en Argentina*. Retrieved from [https://www.minem.gob.ar/archivos/Reorganizacion/renovables/presentaciones/ARGENTINA\\_-\\_Energias\\_Renovables\\_-\\_Nuevo\\_Marco\\_Regulatorio\\_y\\_Perspectivas\\_2016.pdf](https://www.minem.gob.ar/archivos/Reorganizacion/renovables/presentaciones/ARGENTINA_-_Energias_Renovables_-_Nuevo_Marco_Regulatorio_y_Perspectivas_2016.pdf)

Ministry of Energy and Mineral Resources [MEMR]. (2020, November). *Collaborating with UNDP, Ministry of EMR Organizes Renewables Training*. Retrieved from <https://www.esdm.go.id/en/media-center/news-archives/gandeng-undp-kementerian-esdm-selenggarakan-training-ebt>

Ministry of Energy. (2018). *Kenya National Electrification Strategy: Key Highlights*. Retrieved from <https://pubdocs.worldbank.org/en/413001554284496731/Kenya-National-Electrification-Strategy-KNES-Key-Highlights-2018.pdf>

Organization for Economic Cooperation and Development [OECD]. (2020, October). *Making the green recovery work for jobs, income and growth*. Retrieved from <https://www.oecd.org/coronavirus/policy-responses/making-the-green-recovery-work-for-jobs-income-and-growth-a505f3e7/>

Organization for Economic Cooperation and Development [OECD]. (2020). *Green Recovery Database*. Retrieved from <https://www.oecd.org/coronavirus/en/themes/green-recovery#green-recovery-database>

R2820. (2020, October). *Diputados abordó el proyecto de Ley de energía renovable y autoconsumo*. Retrieved from <https://r2820.com/notas/diputados-abord-el-proyecto-de-ley-de-energia-renovable-y-autoconsumo.htm>

- REN21. (2020, June). *Is Renewable Energy the Definition of Resilience?* Retrieved from REN21: <https://www.ren21.net/renewable-energy-resilient/>
- Renewables Now. (2021, July). *Kenya's 100-MW Kipeto wind park is fully commissioned.* Retrieved from <https://renewablesnow.com/news/kenyas-100-mw-kipeto-wind-park-is-fully-commissioned-746897/>
- Reuters. (2019, October). *Indonesia launches agency to manage environment funds.* Retrieved from <https://www.reuters.com/article/us-indonesia-environment-idUSKBN1W00V8>
- Richter, A. (2020, October). *GDC mobilizes 2nd drilling rig to Baringo-Silali geothermal project in Kenya.* Retrieved from <https://www.thinkgeoenergy.com/gdc-mobilizes-2nd-drilling-rig-to-baringo-silali-geothermal-project-in-kenya/>
- Rystad Energy. (2020). *Above a million OFS jobs will likely be cut in 2020 as COVID-19 and low oil price take toll.* Retrieved from <https://www.rystadenergy.com/newsevents/news/press-releases/above-a-million-ofs-jobs-will-likely-be-cut-in-2020-as-covid-19-and-low-oil-price-take-toll/>
- ScandAsia. (2020, September). *EU-Indonesia Cooperation 2020 publication launched.* Retrieved from <https://scandasia.com/the-european-delegations-in-indonesia-launches-the-eu-indonesia-cooperation-2020-publication/>
- Schneider, H. (2021, September). *Green Hydrogen in Latin America.* Retrieved from <https://www.kas.de/documents/273477/14464285/GREEN+HYDROGEN+IN+LATIN+AMERICA.pdf/265060b1-a3a5-2f10-d065-586c0dc0ddf2>
- Steele, P., & Patel, S. (2020, September). *Tackling the triple crisis. Using debt swaps to address debt, climate and nature loss post-COVID-19.* Retrieved from International Institute for Environment and Development: <https://pubs.iied.org/16674iied>
- Suharsono, A., & Lontoh, L. (2020, July). *Indonesia's Energy Policy Briefing.* Retrieved from International Institute for Sustainable Development: <https://www.iisd.org/system/files/2020-08/indonesia-energy-policy-briefing-july-2020-en.pdf>
- Suharsono, A., Lontoh, L., & Maulidia, M. (2021, February). *Indonesia's Energy Policy Briefing.* Retrieved from International Institute for Sustainable Development: <https://www.iisd.org/system/files/2021-03/indonesia-energy-policy-briefing-february-2021-en.pdf>
- U.S. Department of Energy. (n.d.). *Solar and Resilience Basics.* Retrieved from <https://www.energy.gov/eere/solar/solar-and-resilience-basics>
- Umweltbundesamt. (2020, September). *The Green New Consensus.* Retrieved from [https://www.umweltbundesamt.de/sites/default/files/medien/376/publikationen/thenewgreenconsensus\\_englisch\\_bf.pdf](https://www.umweltbundesamt.de/sites/default/files/medien/376/publikationen/thenewgreenconsensus_englisch_bf.pdf)
- United Nations Development Programme [UNDP]. (2020, November). *Pioneering the Green Sukuk in Indonesia.* Retrieved from <https://www.undp.org/stories/pioneering-green-sukuk-indonesia>
- United Nations Environment Programme [UNEP]. (2020, August). *Cities - where the fight for a green recovery will be won or lost.* Retrieved from <https://www.unep.org/news-and-stories/story/cities-where-fight-green-recovery-will-be-won-or-lost>
- United Nations Environment Programme [UNEP]. (2020, November). *African Countries agree to enhance cooperation on geothermal development.* Retrieved from <https://www.unep.org/news-and-stories/press-release/african-countries-agree-enhance-cooperation-geothermal-development>
- United Nations. (2020). *The Sustainable Development Goals Report 2020.* Retrieved from <https://unstats.un.org/sdgs/report/2020/>
- VividEconomics. (2021). *Greenness of Stimulus Index.* Retrieved from <https://www.vivideconomics.com/casestudy/greenness-for-stimulus-index/>
- Widodo, D. A., Purwanto, P., & Hermawan, H. (2020). Potential of Solar Energy in Residential Rooftop Surface Area in Semarang City, Indonesia. *Advances in Science Technology and Engineering Systems Journal*, 397-404.
- World Bank. (2018, December). <https://www.worldbank.org/en/news/press-release/2018/12/03/world-bank-group-announces-200-billion-over-five-years-for-climate-action#:~:text=Washington%20DC%20%2D%203%20December%2C%202018,to%20take%20ambitious%20climate%20action>. Retrieved from <https://www.worldbank.org/en/news/press-release/2018/12/03/world-bank-group-announces-200-billion-over-five-years-for-climate-action#:~:text=Washington%20DC%20%2D%203%20December%2C%202018,to%20take%20ambitious%20climate%20action>.

# 100% RENEWABLES CITIES & REGIONS ROADMAP

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<https://renewablesroadmap.iclei.org/>



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